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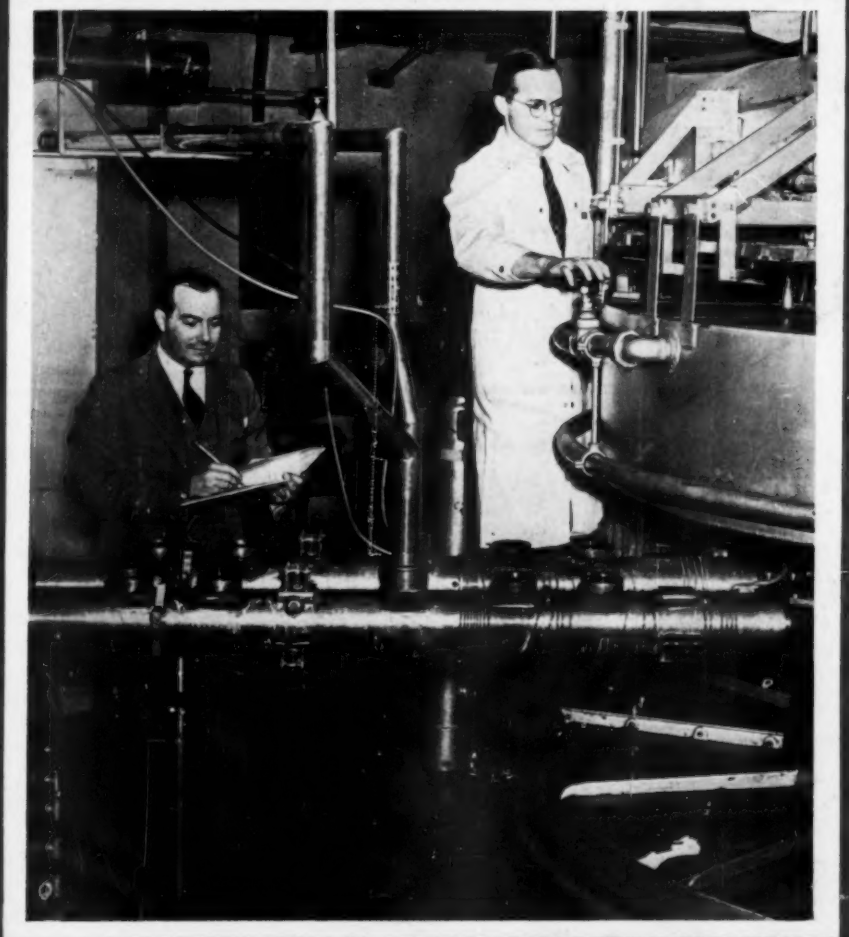
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



February 11, 1939

Atomic Bombardiers

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A SCIENCE SERVICE PUBLICATION

Do You Know?

About 45 per cent. of the deaths from burns occur in children under six years old.

Italians report favorable results with experiments in growing wheat in Ethiopia at an experimental farm.

Sixteenth century armor sometimes had fantastic touches, such as a helmet shaped like a lion's head now treasured at the Metropolitan Museum in New York City.

Archaeologists in England have uncarthed ruins of a town mansion of the Roman era which degenerated into a slum dwelling and was abandoned by 400 A. D.

A British writer says that when two-year-old horses are made to race, the neural spines of the withers become malformed, because the animal is not yet mature enough to carry a jockey's weight.

By filling tree cavities with sterilized wax, forced in by steam pressure, and surfacing the cavities with specially prepared rubber blocks, it is reported that the fillings can sway and give with the trees, without cracking.

An Indian chief who played a big role in diplomatic intrigues, when Spain, England and the United States maneuvered to control the Southeast, was Alexander McGillivray, son of a Scottish adventurer and a Creek Indian woman.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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Do you have to catch a whale before you can weigh him? p. 88.

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Who's a sissy? p. 93.

VITAL STATISTICS

Why are more people being hurt by falls nowadays? p. 94.

An author of a book on shade trees has worked out a table for appraising value of shade trees, according to species, size, condition and location.

European scientists have produced a book describing voices of animals, plus gramophone records, in what is said to be the "first mammal sound book in the English language."

About a million people visited Norris Dam in 1938.

Orange groves are replacing vineyards in some sections of Palestine.

More than 23,000 old Armenian manuscripts kept in libraries in Armenia, India, Persia and other countries, are being catalogued by Armenian scientists.

SCIENCE NEWS LETTER

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MEDICINE

Thrombin Treatment Promises To Save Lives of "Bleeders"

Tried Out Under Extreme Conditions on Animals, Blood-Clotting Substance Stops Hemorrhages

A HIGH-SPEED blood-clotting substance that may prove life-saving to "bleeders" and to patients undergoing surgical operations is reported by Drs. W. H. Seegers, E. D. Warner, K. M. Brinkhous and H. P. Smith, of the State University of Iowa (*Science*, Jan. 27).

Sprayed from an atomizer onto a profusely bleeding wound in an animal's liver, the material checks the bleeding completely in five seconds or less. A small amount (one cubic centimeter) of the material in a one per cent. solution will clot an equal amount of blood within two seconds. Blood normally takes from two to five minutes to clot, and the rate is so much slower in hemophilia that these patients may bleed to death from small cuts.

What the speedy blood-clotting material will do for human patients who are bleeding dangerously remains to be seen after the scientists learn whether the material is sufficiently germ-free to be safe for human use.

"Far more powerful" than any similar blood-clotting substance previously reported, this material is a gray-white powder obtained by special chemical treatment of blood and beef lung. This powder, which dissolves in water, is thrombin.

Thrombin and its role in blood-clotting has been known to scientists for some time. The gray-white powder which the Iowa scientists obtained, however, is a highly purified thrombin and is five times as powerful a blood-clotting agent as the most efficient thrombin previously reported.

This thrombin, the Iowa scientists report, is not poisonous when used to control the oozing of blood from the surfaces of tissues in surgical operations. When it is sprayed on such surfaces, a thin film of blood forms almost instantly and this seals the smaller blood vessels. The larger ones are kept from bleeding by being tied or clamped as a preliminary measure.

Bone and brain surgery should be especially helped by the new thrombin, it appears, if it proves applicable for human use. The prolonged bleeding from bone, often very troublesome to the surgeon during operations, can be checked by thrombin within five to ten seconds. The Iowa scientists report that in animals they have been able, by using thrombin, to cut out portions of the brain and to check with ease the "hemorrhage which is otherwise so difficult to control."

Science News Letter, February 11, 1939

NEW WILDLIFE STAMPS

The 1939 wildlife stamps, now going on sale, include a considerably larger variety of subjects than did the first series, issued last year. Two typical designs are those of a Chautauqua muskellunge, painted by Fred Everett, and of a cougar or mountain lion, by Morgan Stinemetz. The stamps are sold through the National Wildlife Federation and the proceeds used in promoting the study of wildlife problems and the conservation of native animal and plant species.

MEDICINE

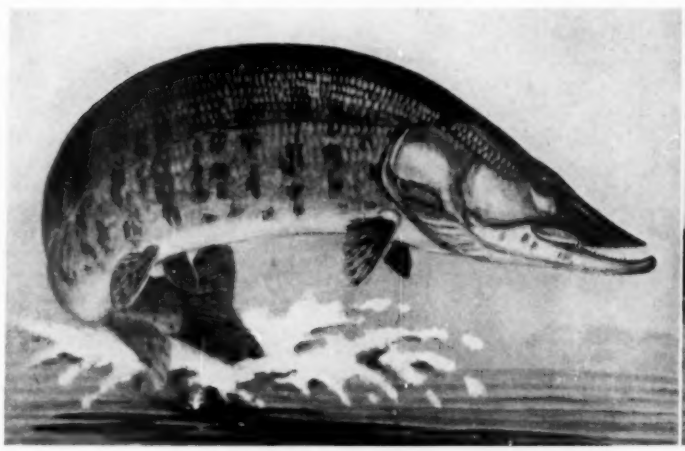
Time Important Factor In X-Ray Treatments

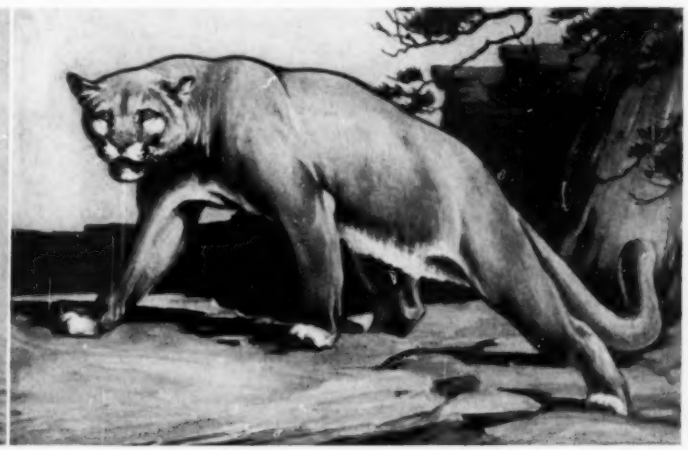
BILLION-volt X-ray tubes for cancer treatment have a magic sound that has won the popular imagination. High voltages and other physical matters such as depth of penetration and wave-length are, however, relatively unimportant in cancer treatment when compared to the prosaic factor of time.

The importance of the time factor has been stressed by Dr. Francis Carter Wood, director of the Institute of Cancer Research at Columbia University.

The time factor in X-ray treatment means the rate at which dosage is applied, Dr. Wood explained. Its importance has long been recognized in the use of drugs. If you swallow a teaspoonful of acetic acid, Dr. Wood said to illustrate this point, it would probably cause a fatal burn. But you can take the same quantity in a French dressing over the course of a week without the slightest damage. The healthy tissues can resist a small amount of the acid but they cannot stand it in a concentrated form.

The same thing applies to X-rays. Giving large doses rapidly does much damage to healthy tissues, scientists now know. This big, rapid dose may damage the cancer tissue also, but what good is that, Dr. Wood asks, if healthy tissue is injured and ulcers or other trouble almost as serious as cancer arises.





X-ray treatment for cancer should be given very slowly, Dr. Wood advises. The slowness is the secret of the success of radium treatment. Radium has always been used in moderate quantities and over long periods because it was impossible to get large quantities of it and physicians had to get the effect by prolonging the treatment.

When physicians do the same thing with X-rays, they get the same beneficial results that radium gives, Dr. Wood declared.

Science News Letter, February 11, 1939

AVIATION

Plywood Airplane Parts Built By Revolutionary New Method

U. S. Army and Navy Officials Keenly Interested In Process Promising Cheap and Rapid Production

THE CHEAPEST and simplest process for mass production of airplanes ever devised is now under secret development at a factory in Bendix, N. J.

Airplane wings, seaplane floats and other large aircraft assemblies are made by wrapping sheets of flexible plywood around formers. The process is very much like the job of building a suit of clothes around a tailor's dummy. This revolutionary new method of plane construction is pioneered by Eugene L. Vidal, former chief of the now nonexistent Bureau of Air Commerce.

Watched by Army, Navy and government aeronautical enginers with the keenest of interest, the process dispenses with costly molds and skilled labor required by other methods of using plastic-bonded plywood. The U. S. Navy is already testing seaplane floats made by the Aircraft Research Corporation, of which Mr. Vidal is president.

Cheap production of 10 or 10,000 planes of a given type is now possible for the first time. Standard methods of all-metal aircraft construction or of molding plastic-bonded plywood all require extremely expensive dies and molds whose cost can be borne only if a large number of planes are made.

After the thin plastic-bonded plywood sheet is wrapped around the formers and has been reinforced by the use of stiffeners, the whole wing or other section is placed inside a rubber bag, from which the air is then evacuated. Air pressure collapses the bag around the plywood, forcing it around the formers.

The wing and rubber bag are then placed in a steam curing oven. After the wing has been cured, the bag is removed. The formers are collapsed and withdrawn from the wing section, and are ready for use again. The rubber bag may also be used over, it is understood.

Mr. Vidal and his associates have not yet manufactured a whole airplane, confining themselves thus far to making the most difficult individual sections.

Science News Letter, February 11, 1939

ENGINEERING

Industrial Mobilization Planned For U. S.

WARNING that force and the threat of force govern the national policy of a number of nations in the world, Assistant Secretary of War Louis Johnson told members of the American Society of Mechanical Engineers that in industrial preparedness the United States is better off now than at any time in its history.

America must stand on guard while this world policy of force exists, Mr. Johnson added, but its preparedness is aimed for defense, not offense; for protection and not aggression; not to wage war but to keep out of war.

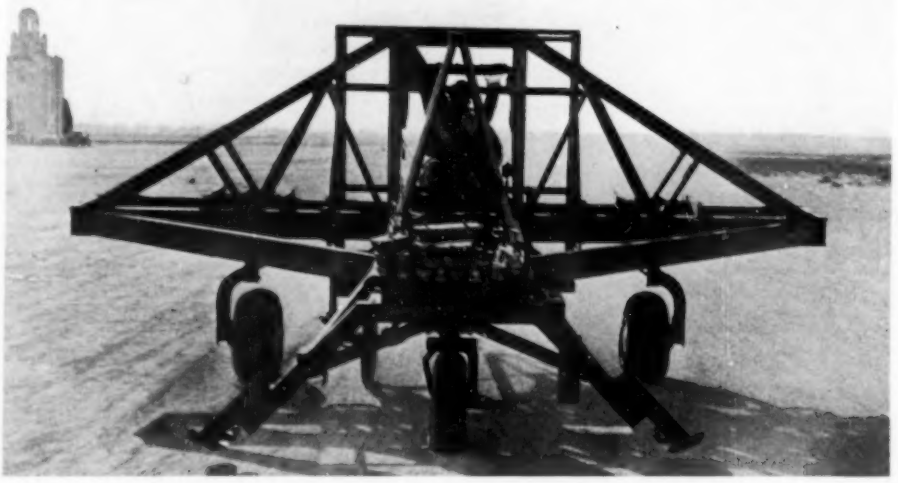
The industrial plans for America's participation in war are now laid, Mr. Johnson indicated. Ten thousand plants, throughout the nation, are earmarked for immediate wartime production if the need arises. Their managers know the tasks assigned to them and have expressed their ability to carry out these tasks.

Mr. Johnson paid tribute to mechanical engineers, as the key men in industrial production, for their cooperation with the Army in its preparedness program.

It was the U. S. Army, Mr. Johnson pointed out, which took Eli Whitney's idea of interchangeable parts for rifles and the concept of mass production and made it the basis of military ordnance.

These basic ideas are still paramount in American military policy. Thus the Army, said Mr. Johnson, ever seeks simple equipment which can be manufactured most easily.

"There is a tendency manifest among military designers of arms, ammunition and accessories," he declared, "to develop complicated machines not readily adaptable for mass production. Against such a trend, we must continually guard. We should strive to develop simple



FOR HAPPIER LANDINGS

This curious-looking cart is no cart at all but a frame used for testing the three-wheeled landing gear with which more and more airplanes are being equipped because of its greater safety. All possible take-off and landing loads were duplicated with this apparatus by shifting the weights on the frame and by towing the apparatus behind an auto.

weapons, whose production would present little or no problems for industry. I realize that some degree of complexity in military weapons is inescapable but, frankly, I believe that there are too many complicated weapons in the Army."

Science News Letter, February 11, 1939

PSYCHIATRY

Healthy Mental Growth Depends Upon the Parents

HAPPINESS and a successful adjustment to what life requires depends, psychiatrists tell us, on two factors—our own hereditary predisposition and the influence of our parents and homes.

Failure, emotional underdevelopment, antagonisms, fears, and breakdowns can be traced to innate weaknesses and to the stunting influence of an unfavorable home.

Parents influence the development of the child not so much by conscious instruction as by providing an example of healthy adulthood. They act as a catalyzer in the process of growing up and of transmuting the infant's love of self into an attachment for others.

In a home where the father is effeminate and "tied to his mother's apron strings" or where the mother acts the part of a spoiled child, a young boy or girl cannot hope for normal growth. When such a handicapped child marries he is in his turn unfit for parenthood.

The consequences of such a vicious circle of maladjustment were emphasized by Dr. Bernard Glueck, New York psychiatrist. To wait until a child has become the victim of his own maladjustment to remedy the situation is just shutting the barn door after the horse has been stolen, he pointed out.

When the importance of the family in the destiny of the child is genuinely appreciated, he said, the best educational enterprises of society must inevitably be focussed upon deliberate preparation of the individual for marriage and parenthood.

"The personalities and conduct of the parents," he declared, "and the home setting created by them and the other members of the household, constitute the most important forces for good or evil which can affect the child's growth and adjustment."

Although the personalities of parents are, unfortunately, pretty much fixed unalterably in their own childhood, we can with our increasing knowledge little by little modify our homes so that each generation has a better chance than had their forebears.

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PSYCHIATRY

Mental Breakdowns Occur On the African Veld, Too

NEW EVIDENCE for a similarity between the minds of men in darkest Africa and residents in the capital city of the United States was seen when a film taken in a mental hospital of South Africa was shown before an audience of anthropologists in Washington.

Mental breakdown occurs on the Veld as it does in the modern metropolis. And the mentally ill are considered "queer" by their neighbors in primitive society just as they are in civilization.

Bantu patients coming to the mental hospital in Africa bear evidence of never having taken part in the rites introducing them to manhood. Many have never been taken into the tribes as adults, presumably because it was recognized that they were not acceptable.

Neither had they taken part in the usual social customs of the tribe. Among the Bantus, the boys and girls customarily take part in a sort of courtship custom not unlike the old New England custom of "bundling." But Dr. J. B. F. Laubscher, the psychiatrist who filmed these African mental patients, found that many of them had never been able to attain such terms of intimacy with any girl in the tribe.

Those who consider mental breakdown to be the result of the excessive strains of modern civilized life may find food for thought in the faces of the Bantu actors in Dr. Laubscher's real-life film drama. The patients in this faraway African hospital can be matched, case for case, in St. Elizabeth's Hospital at Washington, D. C. The amazing similarity of symptoms was pointed out by Dr. Winfred Overholser, St. Elizabeth's superintendent.

On the veld as in Washington, you may see men beating on their breasts or heads in the curious stereotyped gestures of the schizophrenic. You may see the tremors of the encephalitis lethargica victim. And you may see epileptics. Paranoid cases are not, however, so common among these primitive people.

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ARCHAEOLOGY

Old Romans Started Idea Of Family Portraits

ANCIENT Romans started the idea of family portraits.

People today look curiously at a family album of daguerreotypes, as something quite old in family groups. Tourists in European castles are impressed by the rows of ancestral portraits.

But to see the custom at its start, go back to ancient Rome. Noble Romans paraded the sculptured busts of their ancestors, literally paraded them. These proofs of their aristocratic lineage were brought out and marched along in funeral processions of distinguished dead.

Romans with pride in their family trees not only originated the portrait bust but also the family gallery, and the family group.

Exploring the reason for making family pictures, in the first place, a German scientist, Prof. Erich Bethe of the University of Leipzig, has traced the idea to a barbaric source.

Primitive man, including Romans in their early history, believed that the soul of a dead person had great power to bestow good luck or bad on surviving members of the family.

Early Romans probably had this in mind, Prof. Bethe believes, when they buried the head of the family in the house itself, at his death. As he was the outstanding member of the family, his spiritual power was a special heritage.

There may have been other reasons also for this gruesome way of burial. At any rate, it continued until the Romans acquired higher standards of sanitation and placed cemeteries apart from their homes.

But belief that the soul lived on, influencing the Roman family, persisted. As the head was the most important feature of the human body, the Romans came to accept a death mask or portrait as a substitute for the ancestor's real presence in the house.

Science News Letter, February 11, 1939

PHYSICS

Atomic Energy Released

Millions of Electron-Volts Given off When Uranium Is Split by Bombardment With Low-Energy Neutrons

By WATSON DAVIS
and ROBERT D. POTTER

See Front Cover

IS THE WORLD standing on the brink of the release of atomic power?

This question is paramount in scientific circles, following confirmation in several laboratories of the extraordinary release of atomic energy from the splitting of the uranium atom. Perhaps these experiments are more important than even the discovery of radioactivity itself.

First of all, the physicists are anxious that there be no public alarm over the possibility of the world being blown to bits by their experiments. Writers and dramatists (H. G. Wells' scientific fantasies, the play *Wings Over Europe,* and J. B. Priestley's current novel *Doomsday Men*) have over-emphasized this idea.

Heavy Element Split

What is the new experiment that is so exciting?

Uranium, heaviest of stable elements and a sort of granddaddy among the radioactive elements that slowly disintegrate spontaneously, has been split with great release of energy. And the atom-splitting agency is the neutron, the electrically neutral particle discovered only seven years ago, itself a part of the hearts of atoms.

Bombard uranium with neutrons, even those with only a fraction of an electron-volt of energy, and its nucleus will split and give off millions upon millions of electron-volts of energy, up to 100,000,000 volts in actual experiments and some 200,000,000 volts theoretically.

Of course, it is not nearly so simple as this sounds, for there is the matter of producing the neutrons and arranging it so they hit frequently enough to make the process efficient, which it is not as yet.

But the energy release is astoundingly high, nevertheless, since the greatest release of atomic energy hitherto achieved consisted of 20,000,000 electron-volt gamma rays, obtained when deuterons, hearts of heavy hydrogen atoms, are smashed into lithium, a light metal. Incidentally, neutrons are given off at the same time and it is these neutrons that can be used to split uranium.

Neutrons slide into the nuclei of elements easily and for that reason the energy-releasing bombardment, to be efficient, would probably need to be performed upon very pure substances, such as seldom exist now. This is probably the reason why the effect was not discovered accidentally, perhaps through a laboratory explosion.

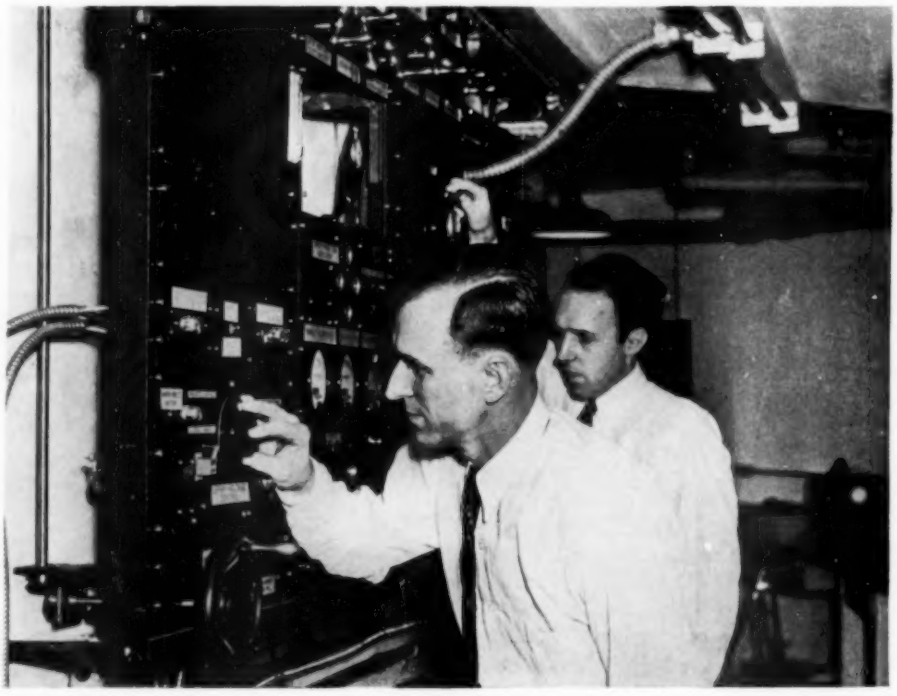
This latest chapter of physics began in its immediate phases with researches in Berlin by Prof. Otto Hahn. He observed the strange action of uranium under neutron bombardment but could not quite account for it. Dr. Liese Meitner, long associated with Prof. Hahn, and Dr. R. Frisch of Copenhagen, suggested the idea of uranium splitting into other elements, which although unheard of previously proved to be the case. Ironically, Dr. Meitner is now an intellectual refugee from Germany temporarily working in Stockholm.

This work, just reported in *Die Naturwissenschaften,* German science journal, became known first by private communication from Prof. Hahn and later through publication. The Hahn-Meitner-Strassmann paper was the sensation of the theoretical physics conference under auspices of the Carnegie Institution of Washington and George Washington University.

Atom smashers were rushed into service to confirm or deny the German work. Long distance telephones provided prompt communication. At least four independent confirmations have been obtained.

It was learned subsequently to the Washington conference that the experiment was confirmed in Copenhagen at Prof. Niels Bohr's laboratory about Jan. 15. Prof. Bohr, world famed Nobelist, is himself in America visiting Princeton University.

Columbia University, whose research



AT THE CONTROLS

Drs. R. C. Meyer and Richard B. Roberts of the Carnegie Institution of Washington, setting the controls of the electrostatic generator with which they demonstrated the release of atomic energy from uranium.

team consists of Prof. John Dunning, Dr. E. T. Booth, Dr. G. N. Glasoe, H. L. Anderson, Prof. S. G. Slack, Prof. George B. Pegram, and Prof. Enrico Fermi, confirmed uranium's energetic splitting on Jan. 25. (Prof. Dunning and Dr. Booth are shown at work, in the cover illustration).

The Carnegie Institution of Washington's Department of Terrestrial Magnetism, directed by Dr. John A. Fleming, got into action with their new atom smasher as soon as they heard of the Berlin experiments and in a historic midnight experimental conference on Saturday, Jan. 28, demonstrated to Prof. Bohr and Prof. Enrico Fermi, Italian Nobelist now at Columbia University, pioneer in neutron bombardment of uranium, the reality of the energy's release. The Carnegie research crew consisted of Drs. Richard B. Roberts, R. C. Meyer, N. P. Heydenburg, L. R. Hafsted, and M. A. Tuve, assisted by a Carnegie associate, Dr. Gregory Breit of the University of Wisconsin.

On Saturday morning (Jan. 28) the Johns Hopkins University, in experiments conducted by Dr. R. D. Fowler, confirmed the discovery also.

Other Elements Bombarded

Convinced of the reality of the energy release from uranium, there will be a great rush to complete science's current mystery problem. Neutrons will be turned—are being turned at this moment—upon other heavy elements.

Crucial point of the original Hahn experiments, Prof. Fermi said, is the careful chemical tests on the products resulting from the bombardment of uranium with neutrons. These products had previously been considered to be isotopes of radium but when Dr. Hahn, one of the world's best physical chemists, sought to detect the presence of radium in them he was unable to do so. Instead, he found only isotopes of barium.

Thinking his method might have been in error he intentionally placed a known radioactive compound, mesothorium, in his mixture of supposed radium isotopes and found that while the mesothorium followed the usual separation the radium isotopes did not. Thus he had to conclude that his bombardment of uranium with neutrons split the uranium into two parts about half as massive; into barium and probably into krypton also.

Prof. Fermi, in explaining his own original work, said he had tested the supposed trans-uranium elements to see that they were not mistakenly some of the six or seven elements just below uranium in the periodic table of the chemical elements. The idea of checking them against such relatively light elements as barium, only half as massive as uranium, never occurred to him or to any one who has worked in this field before Dr. Hahn.

Dr. Hahn in his report amplifies this point by indicating that the experiments are contrary to all previously known experience of physics.

Wild Speculations Feared

Now that scientists have confirmed the discovery of how to release enormous stores of energy bound within uranium atoms, they are fearful lest the public become worried about a "revolution" in civilization as a result of their researches.

They fear that there may be forecasts of the near possibility of running giant ocean liners across the Atlantic on the energy contained within the atoms of a glass of water. Or of using "atom-motors" as energy sources instead of steam and hydro-electric plants. Or the suggested possibility that the atomic energy may be used as some super-explosive, or as a military weapon.

Scientists who have exploded uranium and released its tremendous supply of atomic energy report that the present research is comparable with experiments, a few years ago, on the transmutation of the elements.

For centuries, alchemists had dreamed of transmuting base metals into gold. Enormous wealth—it was imagined—would be at hand for the discoverer of transmutation. Dire forecasts of the effects of transmutation's discovery, picturing a revolution in the world's financial pattern, were made.

But transmutation of the elements has now been achieved for every one of the 92 known chemical elements except two. Yet there has been no revolution in the money marts of the world as a result. It has only become increasingly clear how infinitely difficult it would be to produce enough transmutation, in any element, to fill the pans of a tiny chemical balance. Transmutation's biggest result has been simply the wonderful intellectual impetus which it has provided for physical discovery.

In quite the same way, the dream of releasing large amounts of energy locked inside atoms has been in the minds of men for many years. It is highly probable that the current realization of this dream will have no more effect on the power resources of the world than has the discovery of transmutation on the world's financial exchanges.

AT THE MUZZLE

Dr. Richard B. Roberts of the Carnegie Institution of Washington makes an adjustment at the "business end" of the giant electrostatic generator with which the neutrons were created to split uranium atoms and release 200,000,000 electron-volts of atomic energy.

It takes only a quick calculation to show that even in the most favorable case it requires expenditure of about 3,000,000,000 electron volts of energy to release 200,000,000 electron volts of energy from a uranium atom.

This optimum case is based on the assumption that the three billion volts of energy will create one neutron which can slip into a uranium atom and release two hundred million volts of energy. In actual fact, neutrons are so easily absorbed by all atomic nuclei that many of the neutrons produced (each at the cost of three billion volts energy) will only go into atoms other than uranium.

Thus the process is only a little over six per cent efficient for the most favorable case and, in (*Turn to Page 93*)

BIOMETRICS

New Formula Gives Weight Of Whales if Length Known

WHALES can now be "weighed" without being taken out of the water, or even being harpooned. All you need to know is their length. That, multiplied by itself a certain number of times, and the result multiplied by a constant, gives the weight, according to a mathematical formula worked out by Dr. Leonard P. Schultz, curator of fishes in the Smithsonian Institution.

Dr. Schultz has worked out formulae for various types of whales and also for the larger "streamlined" fishes. He has found that there is a constant relation between length and weight, though the figures used in the formula differ for each kind of whale or fish.

Science News Letter, February 11, 1939

BIOLOGY

Sex Determination Possible If Sperms Can be Sorted

BOY or girl? The everlasting question, that always raises itself when a new addition to the family impends, is paralleled by the more matter-of-fact, cash-based one of male or female that haunts all farmers and stockmen at calving or lambing time. If a practical method could be worked out for pre-determining sex it would have revolutionary effects both in human society and in the livestock industry.

Dr. Arthur Walton, of the Cambridge University school of agriculture, reviews work that has been done thus far in search of an answer to this everlasting question. He reaches the conclusion that although no way of controlling the sex ratio has yet been found, the attempt is by no means hopeless.

Clue to sex determination lies in the "x" and "y" chromosomes in the spermatozoa. If an ovum is fertilized with a spermatozoon bearing an "x" chromosome, the offspring will be female. If it is the "y" chromosome, the new animal will be male. Sperm from the male parent always contains approximately equal numbers of both kinds of spermatozoa, thoroughly mixed. It has therefore always been a matter of chance, what the sex of the offspring will be.

Obviously, if one could somehow separate the two kinds of spermatozoa, and use "x" or "y" kind according to the results desired, the problem would be solved. That is just where the difficulties begin. Various experimenters have tried all kinds of methods; passing an electric current, swirling in a centrifuge, treating with various chemicals. But the "x" and "y" have stubbornly remained mixed.

Nevertheless, Dr. Walton considers it worth while to continue trying: "There is some evidence that under certain conditions as yet unspecified, there is a differential mortality of one or the other of the two sorts of spermatozoa. If subsequent research can elucidate these conditions sex control by means of gametic separation and artificial insemination might become practicable."

Science News Letter, February 11, 1939

FOODS

Use of Food Lockers Lowers Meat Cost

IN NORTH and South Carolina during watermelon season it is the practice of many families in small towns to have a few melons cooling down at the community ice plant awaiting proper gustatory disposal. Although no fee is charged and the practice would have to be discontinued if it ever became too prevalent, this custom makes use of what is becoming known in the Middle and Far West as the "food locker."

Food lockers started, just as the melon instance indicates, as a sideline with the ice plants. But now the practice has been put on a commercial scale and one can rent a food locker just as you might rent a safety deposit box at your bank.

While vegetables and fruits furnish some small part of the revenue of companies managing food lockers, the great bulk is in the cold storage and freezing of meat. Many plants furnish services in butchering, chilling and aging of meat along with such other packing house operations as curing, smoking, rendering of lard and grinding.

In fact, if you can afford to buy a whole carcass of beef you can have it processed completely for you and preserved until you can use it. At normal prices and yields from live beef, it is reported that the cost of the average run of beef cuts will be about 15 cents a pound to the food locker patron as compared with an average price of 26 cents a pound at retail.

To the farmer a whole beef is no new thing in his meat consuming habits but to a city dweller a marked change in family buying and eating habits is needed. Moreover, a plan has to be worked out for a satisfactory use of the less desirable cuts of meat.

Science News Letter, February 11, 1939

IN SCIENCE

MEDICINE

Diabetics Must Know The Answers—127 of Them

MANY persons boast they "know all the answers," but for diabetics, of all people, this boast must be true. The diabetic patient's life, health and happiness depends largely on his really knowing the answers—127 of them, the Mayo Clinic specifies.

This (127) is the number of questions which patients attending the Clinic's diabetic school are required to answer before they are willingly dismissed. There can be no coaching from the sidelines, either, when the patients are asked to answer these questions.

Diabetes is a condition in which the body fails to take care of sugar normally. Usually this failure is due to deficient insulin production by the islands of Langerhans in the pancreas. To make up for this deficiency, the diabetic patient gets insulin. Too much insulin, however, is as dangerous as too little. The dose must be nicely adjusted to the amount of sugar the patient gets from his food.

Allowances must also be made for the amount of sugar he can take care of without any outside insulin, since his body may produce a little of this hormone, even if not enough. This factor may vary and if it does, the insulin dose must be varied, or the patient is headed for trouble—either diabetic coma or the reverse condition of insulin shock.

The patient has to know about this in order to appreciate the need for being alert to danger signals. He also must know how to recognize and watch for these danger signals, and how to make the chemical tests for one of them. The diabetic patient must also know how to measure the dose of insulin—no simple feat—and how to inject it hypodermically. He must know how much of which foods to eat, down to the last teaspoonful. He must be prepared to apply certain special first aid measures for himself when danger threatens. Finally, as he gets older, he must learn how to care for his feet so as to avoid gangrene.

Science News Letter, February 11, 1939

NCE FIELDS

PSYCHOLOGY

Men Differ in Abilities To "Transfer Training"

"ONE MAN is just as good as another—and sometimes more so!" This famous Irish bull is brought to mind by a ten-year research just completed by Dr. F. L. Wells, of Boston Psychopathic Hospital, in which he found how different men are, one from another, in ability to profit by experience and in ability to transfer learning from one sphere to another.

Equal opportunity by no means insures equal achievement, Dr. Wells concluded from his study which is summarized in the *American Journal of Orthopsychiatry*.

Comparing intellectual endowment with money in a savings account, Dr. Wells said:

"Let pupil A have ten dollars on deposit; pupil B, twenty. Although each account has the same 'opportunity' B's account will increase twice as fast as A's. The longer this equality of opportunity operates, the greater will be the disparity.

"Similarly, if B has a superior intellectual 'endowment' he must, given equal learning conditions, increase it faster than A. Just as his learning would accelerate if starting equally, he learned at the higher interest-rate of a better school.

"Equality of opportunity can mean equality of development only if the endowments at the starting point are the same. That they are mentally far from being so when school years are reached is common knowledge. How far this difference would level out if equal 'opportunities' existed from birth, is much disputed. Only extremists have claimed, in effect, that they would level out altogether."

Just as men differ in their ability to make use of what they learn in one field to help their success in another, so also types of work differ in the extent to which such transfers can be made.

Work of an extremely intellectual type, putting a high premium on ability to generalize and to form mental conceptions is facilitated when the individual has had previous training in similar types of mental labor.

Work involving simpler motor skills is profited less by previous training in other skills. In fact, highly specialized training in one skill may actually make more difficult the learning of a new one.

Science News Letter, February 11, 1939

ENGINEERING

New Generators Run Sealed in Hydrogen

STREAMLINING is the current trend in everything from totally immovable objects like a bathtub to the newest of the airplanes.

In the former, streamlining is debased from its original scientific definition into a style mood. In the latter, streamlining serves a real scientific purpose. The smooth contours have the functional objective of decreasing wind resistance.

If the atmosphere of the earth were of hydrogen, however, instead of nitrogen and oxygen and the sprinkling of the lesser and rare gases, there would be little need of streamlining even in airplanes.

Hydrogen's low density, compared with air, makes it possible to move objects through it with hardly any loss due to wind resistance.

All this would be so much imaginative fiction if there did not exist, in the world, a little, man-made realm where the atmosphere is intentionally composed of hydrogen for just this very purpose; the lessening of losses due to atmospheric resistance.

The application of hydrogen's lessened drag is in the new high-speed turbine-generators which are now being built. Back in 1921 Dr. Willis R. Whitney, the now-retired director of research of the General Electric Company, built some small generators in which the turning parts were enclosed in an atmosphere of hydrogen.

For some years the application to large generators lay dormant because no suitable seal to keep in the hydrogen could be found for a practical application. Since 1937, however, this problem has been solved and 21 units, aggregating more than a million kilowatts of power, have now been installed.

The advantages of hydrogen are many, writes Dr. Chester W. Rice in the *General Electric Review*. It practically eliminates losses due to wind resistance. Its high heat conductivity aids in cooling the units. The absence of oxygen eliminates fire hazard, prevents deterioration of the generator windings due to oxidation and eliminates the destructive effects of corona losses.

Science News Letter, February 11, 1939

PHYSICS

New Radio Apparatus Uses Waves Only 4 Inches Long

TELEVISION and aeronautical radio will be given a great impetus by the invention of the "klystron" ultra-short wave radio apparatus at Stanford University. It sends and receives on wavelengths as low as 10 centimeters (4 inches) at efficiencies not hitherto attained. It is hailed as "the most important advance in radio since the invention of the audion tube in 1906 by Lee de Forest."

Invented by Russell H. Varian and developed by a Stanford group, including Varian, his brother, Sigurd F. Varian, Profs. William W. Hansen and David L. Webster, the klystron grew out of the rhumbatron, an electric resonator intended to smash the atom.

Flight Capt. Sigurd Varian was a Pan-American Airways pilot when he visualized that the rhumbatron, developed by Prof. Hansen, could be applied to radio communication for airplanes. Taking leave of absence from his Pan-American job, he organized the Stanford group for the research which is now successful.

Two rhumbatrons, called the "buncher" and the "catcher," form the heart of the klystron, so named from the Greek "klyzo," meaning waves breaking on a beach, which is what the apparatus does.

Science News Letter, February 11, 1939

PHYSICS

Thunderless Lightning Described by Scientists

THE POPULAR belief that all lightning flashes except heat lightning, are accompanied by thunder claps is not always true, declares Dr. Karl B. McEachron, high-voltage expert of the General Electric Company.

The absence of thunder with heat lightning is well known, but it is generally thought that a distinct lightning stroke from the skies to the earth always has a peal of thunder with it. This is true in most cases, says Dr. McEachron; but studies now show that for "slow" lightning there often is no accompanying thunder. Slow lightning is a discharge which takes one or two tenths of a second to build up, whereas the lightning producing thunder takes only a few millionths of a second to do its work.

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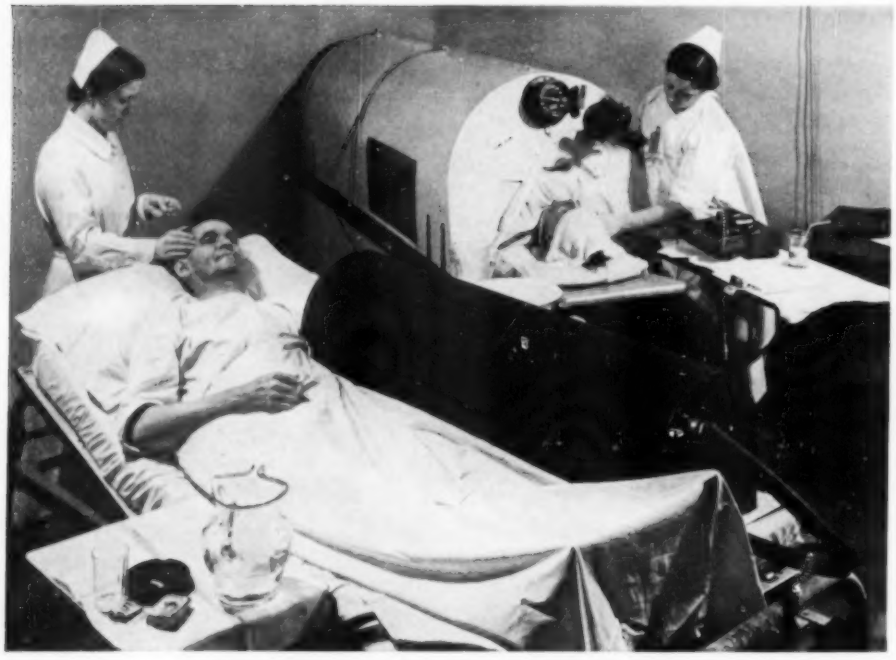

AIR-CONDITIONED ARTIFICIAL FEVER

Two of the new cabinets in operation at St. Francis Hospital, Pittsburgh. In foreground, fever treatment is being given to one of the patient's arms in a "local treatment" cabinet. In background, a patient is shown in the larger cabinet that treats the entire body.

MEDICINE

Conditioned Heated Air Induces Fever That Cures

In Year of Tests, New Treatment Benefits Patients Suffering From Wide Variety of Serious Maladies

AIR conditioning—the reverse of the kind that keeps you comfortable on hot summer days—has been used to induce healing fevers in a new kind of fever treatment instituted in Pittsburgh hospitals during the past year.

Instead of cooled, dried air used for summer comfort, air that is heated and moistened by water is used to induce artificial fever of 104 to 106 degrees Fahrenheit within the patient's body.

Patients suffering from a wide variety of ailments, ranging from gonorrhea and syphilis to St. Vitus' Dance and "sleeping sickness" or encephalitis, have been helped by the new kind of fever treatment, according to a report made by Drs. T. Lyle Hazlett and Murray B. Ferderber of the University of Pittsburgh School of Medicine. These scientists are in charge of a fever treatment research program made possible by a $50,000 grant to the University by the Westinghouse Electric and Manufacturing Company.

Fever treatment of various ailments has been widely used for some years. Sometimes the patients have been given malaria or a dose of typhoid germs to induce the beneficial high temperatures. Another method used is a fever treatment machine which passes short radio waves through the patient's body to elevate his temperature.

This is said to be the first time heated and moistened air has been used to induce fever for treatment of sickness. The machine, a long cylindrical cabinet, was designed by Dr. Ferderber and F. C. Houghton and Carl Gutberlet of the American Society of Heating and Ventilating Engineers.

Within the cylinder is a duct and spray system attached to the hot and cold water supply of the hospital and regulated by thermostatically controlled mixing valves which "set" the temperature of the water. Air is sucked out of one side of the cabinet, completely saturated with the hot water and returned to the cabinet.

Science News Letter, February 11, 1939

ANTHROPOLOGY

Fascism and Other Isms Ancient in Origin

PEOPLE who are alarmed over the trend in modern civilization can get some comfort from the ups-and-downs of ancient Greek and Roman eras.

Way back in Homer's day, poets considered man had seen better days, and was reduced to a second-rate decadence. So the American Philological Association was reminded by its president, Prof. W. A. Oldfather of the University of Illinois, in an address on ancient thought regarding man's progress and decadence.

The ultra-blue-blooded Plato in the fourth century B.C. was preoccupied with the idea of an urgent need to re-establish the shattered structure of human morality, Prof. Oldfather said. But Plato gave up hope of appealing to all mankind in democratic fashion and pinned his faith on refashioning society under despotic authority of a little group of warrior-saints, who would benevolently look out for the common folk.

Greek orator Demosthenes urged what Prof. Oldfather called "a primitive variety of foreign-policy fascism," in order to save society in the same fourth century. Phaleas urged a rigorous communism. Isocrates, "a Greek Peter the Hermit in cap and gown," preached a kind of Yellow Peril crusade against Persia.

As a Roman thinker, Horace in the first century before Christ was pretty nearly devoid of social outlook. But his concern with the individual's welfare and happiness was just what the modern world will return to, when it settles its confusing problems about economic relations, Prof. Oldfather foresees.

Science News Letter, February 11, 1939

● Earth Trembles

A severe earthquake on January 30 was given the following provisional epicenter by the Manila Observatory, Manila, P. I.:

Monday, January 30, 12:18.6 p.m., (local time)

Near the Solomon Islands. Latitude 7 degrees south, longitude 155 degrees east.

For stations cooperating with Science Service in reporting earthquakes recorded on their seismographs, see SNL February 4, 1939.

PSYCHIATRY

Gangsters Use Metaphor As Escape From Reality

WHEN the gangster calls his machine gun a "typewriter," or his lethal bomb a "pineapple," he may be trying to soften with poetic metaphors the unpleasant reality of his life.

The speech of the criminal is filled with metaphor and substitute words. With many of them the public is familiar; many more are never heard outside the circles of crime.

In adopting his lingo, the criminal may also be motivated partly by the same human trait that makes the physician write his prescriptions in Latin and the scientist compose his speeches in technical terminology. It is the motive back of the secret grip of fraternal organizations—a way of identifying oneself with a certain group and aweing or mystifying the uninitiated.

But in addition the euphemistic language of the crook is a mechanism of escape from hard facts. In a report to the *American Journal of Psychiatry*, Dr. Mandel Sherman, of the University of Chicago, quotes a prison conversation illustrating this type of escape wording:

"As soon as I got out of the bird cage (cell) this morning," said the prisoner, "I went to the mess hall and tanked up on mud (coffee) and bread. Then at noon we had rubber heels (slices of meat loaf) with some fish eyes (tapioca) after. Sundays we get mountain goat (mutton) or sometimes leather (beef). If I don't get a hooker (warrant for immediate rearrest) I'll soon be out of this can (prison) with at least a pocket full of rattles (silver money)."

Gangsters do not kill their victim, they take him for a ride or bump him off. They are not imprisoned for their crimes, they take the rap or go up the river.

Escape or evasion of reality is the diagnosis of psychiatrists.

The unfamiliar words of European news articles of recent months make one wonder whether statesmen may not be similarly attempting escape in euphemism from unbearable reality.

Is this the reason why we hear of "quarantine" instead of embargo, "sanctions" instead of reprisals and "plebescite" instead of conquest?

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ARCHAEOLOGY

Nile-Meters Are Ancient But Floods Are Still Studied

THE Nile flood of 1938 was exceptionally high. It is believed the highest in 40 years.

The curious thing about that—if you pause to consider—is that there should be doubt as to what is a record-breaking overflowing of the Nile. Why, for thousands of years, the rise of the Nile has been the greatest reality in Egypt's welfare. No records? Incredible!

Actually, there have been records.

Even in ancient Egypt, certain priests had Nile-meters in their mysterious precincts. One of these Nile-meters was discovered a few years ago near the Nile beside a temple a pharaoh built about 1300 B. C.

This Nile-meter building had a reservoir in a central court. As the Nile began to rise in July, priests recorded the height of water in the reservoir for two months, so as to report to the wondering people the revelations from the river god.

A strange incident occurred at this Nile-meter, when Christians in the fourth century A. D. took refuge there during religious strife. They left inscriptions and drawings on the walls. And they took over, apparently, the duty of forecasting the flood. They remained in this refuge for nearly a century.

Egypt has kept up efforts to measure the Nile. There are long, though incomplete, records from a Nile-meter in Cairo from 622 A. D.

But such records lack precision of modern observations, comments Dr. H. E. Hurst, who discusses the recent flood year in the British journal, *Nature*. It is only since the present century began that current meters have been introduced in Egypt.

Analyses of available records indicate that in the past 70 years the Nile has had a high term of 30 years followed by 40 low years. But, Dr. Hurst points out, we still do not know whether the Nile is entering on a term of high floods. Its ways are still far from completely predictable.

Science News Letter, February 11, 1939

CHEMISTRY

Science Resourceful in Making Paper Tell Age

THE papers!

Many a false clue in crime has hinged on "the papers" having been faked and given a look of authentic age.

Many a questionable first edition book has turned out to be a forgery, on paper of recent make.

And yet, paper experts have received far less attention than ink experts. Somehow, it was hard to be sure and definite about the age of a scrap of paper.

But that situation is changing. New ways of analyzing paper have been found. Obscure facts in paper history have been ferreted out. And these two developments were what experts needed.

A British paper expert, Dr. Julius Grant, believes that this line of research will become increasingly valuable.

It is possible now, he reports, to an-

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alyze raw material in a piece of paper and to tell whether the wood—if it is pulp paper—was prepared by a chemical or mechanical process. And if the investigator knows his paper history, he can say that the materials and process indicate that the paper was made after a given date.

Dr. Grant tells some paper facts that prove useful. For example, until about 1800 all paper was made of rags, mainly linen or cotton. In the eighteen fifties a rag shortage was so acute that straw eked out rags in paper. Esparto grass was first processed in 1861; wood some twenty years later.

Rosin was used to make paper take ink better, at first in Germany, then more widely about 1835. Paper loaded with titanium dioxide and associated white pigments is later than 1930. Calendered papers date from 1830; coated papers from 1890.

Some landmarks in paper history are still vague, but not the recent ones. Sherlock Holmeses of the paper world keep close track of current changes in the industry.

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ETHNOLOGY

Feudal State Preserved On Island of Sark

THE FEUDAL age is supposedly dead. But England has a sample of it left, like a living bit of archaeology.

This feudal state, the Island of Sark in the Channel group, is still held under the charter Queen Elizabeth granted to a Norman in 1565. A Norman descendant, Sybil Hathaway, and her American-born husband, Robert Hathaway, are dame and seigneur of Sark.

Mr. and Mrs. Hathaway—they have long Norman titles at home—have been visiting our shores and giving some Americans a chance to gaze at two amiable moderns who are actually expected to protect an island in return for public duties performed by their loyal tenants.

There is no unemployment in Sark, says Mrs. Hathaway; no automobiles, no street lights. The 600 inhabitants are mainly fishermen and farmers. A parliament of 52 men and women make laws, which Mrs. Hathaway can veto if she sees fit. The people speak ancient Norman, interlarded by English words like radio and telephone. Education has been compulsory in Sark since 1805, or before England had it. English and French are taught to Sark children. Tourists are a source of revenue, to the tune of 25,000 visitors a year.

People of Sark, Mrs. Hathaway emphasizes, are not British colonists. They are Normans. They are her feudal tenants, and she is the King's feudal tenant. She pays every year a twentieth of a knight's fee.

Asked how she spends her time at the feudal manor, she says she has a farm, is keen about dairying and has a dairy diploma, likes gardening, receives endless visitors. Every problem on the island is brought to her door.

Her husband, who must sign state papers, is nevertheless secondary. He once asked someone to make his position clearer, and was told, "Well, if your wife committed murder, you could be hanged for it."

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FOODS

Many New Juices to Join Familiar Ones on Table

FOR the breakfast menu of a few years hence: Rhubarb juice. Passion fruit juice. Guava juice. Strawberry juice. Blueberry juice. These are new products that the giant-infant of the food industry, the juice business, is about to make available for your pantry.

Tomato, grapefruit and pineapple juices are the leaders in this array of liquids. Yet prior to 1925 bottled and canned juices were limited to bottled grape juice and small amounts of bottled apple, loganberry and other berry juices.

Grapefruit juice came in in 1926, tomato juice was packed first on an important scale in 1928 and pineapple juice joined the procession in 1931.

The total quantity of fruit and vegetable juices preserved exceeded 32,000,000 cases in 1937. The volume is still growing and tomatoes alone provide approximately 13,500,000 cases annually.

Canned orange juice introduced in 1930 reached large commercial production in 1934. More recently lemon and cranberry juices have appeared, along with the "nectars" of apricots, peaches and pears. Plum, cherry, papaya, currant, tangerine and pomegranate juices are available. Sauerkraut juice is well known and small amounts of celery, spinach, carrot, garlic, onion, beet and lettuce juices are packed.

Three recent developments, it can be reported on the authority of Arthur D. Little, Inc., of Cambridge, Mass., are rapidly revolutionizing the industry.

The first, the introduction of continuous flash-pasteurization processes, is of very great importance, as it makes possible the preservation of practically all kinds of fruit juices without the simultaneous formation of a "cooked" flavor formerly thought to be a necessary accompaniment of pasteurized fruit juices. The second development has been made by the leading can companies by the perfection of enamels which prevent the corrosion of the tin by acid juices. Cans have come into general use for fruit juices and are very popular containers for these products. The third advance has been the introduction of cloudy and pulpy juices, which in most cases have much more flavor than the clarified products.

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PSYCHOLOGY

Two Simple Rules Will Help You to Forget

IF YOU have something on your mind that you would like to forget, just follow these two rules:

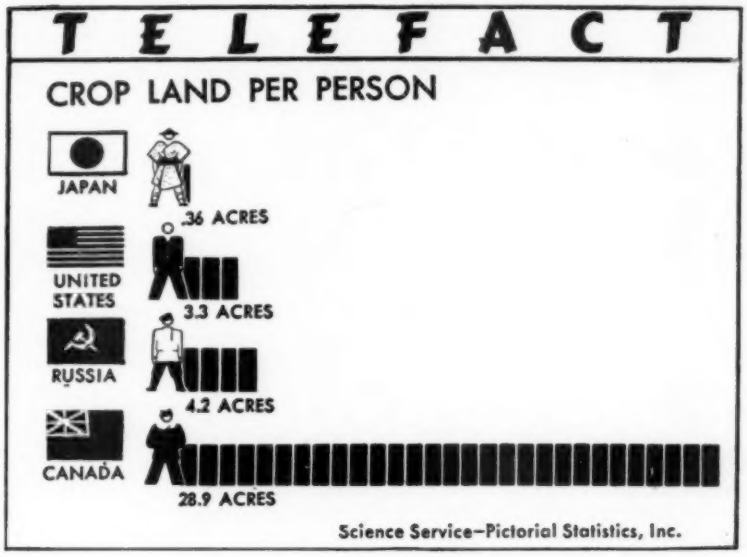
First, fill your days with new interests, new activities, and these will crowd the old from your mind.

Next, transplant yourself to new surroundings away from all the little reminders that bind you to the past.

New learning or activities and new surroundings, Dr. John A. McGeoch, psychologist of Wesleyan University, told the New York Academy of Sciences, are among the major determiners of human forgetting.

Since in actual life, he said, one cannot, short of a psychological vacuum, escape the destroying effects of new activity, the wonder is, not that we forget, but that we remember anything at all.

The only reason we fail to forget everything is because we learn some things very well indeed.



Laboratory tests have shown that by regulating the "interpolated" learning, it was possible to make people forget anywhere from 5 to 90 per cent of what they had previously learned.

The student will remember his tomorrow's lesson better if he goes directly to sleep after learning it than he will if he goes out tonight to a party or to an entertaining show.

The influence of surroundings is also shown, Dr. McGeoch pointed out, in the greater ease which many people experience in working at their familiar desk, and in the difficulty of working as well in a strange office.

We do not forget everything we learn, he said, because somehow these two factors, new learning and new surroundings, are prevented from having their full effect.

We usually remember anything which has been well learned, especially when we try to recall it in a familiar setting.

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reality, is much less efficient on the average.

Finally, scientists point out, the release of atomic energy from uranium need arouse few fears about explosions in nature set off by these physical researches. The very heavy elements in which such an energy release can be secured occur only in very small amounts in the earth's crust and they are greatly contaminated with other elements which do not yield atomic energy. This means that the release of atomic energy can only be achieved by direct intent, in the laboratory, and then only with considerable ingenuity of experiment.

Besides the astounding amount of energy liberated from the uranium atoms, the following appear to be the important consequences of the newest researches:

1. For the first time something other than atomic particles or radiation (alpha and beta particles, positrons, neutrons and gamma rays) has emerged from atom smashing. Uranium seems to be split into two parts, which may prove to be the elements barium and krypton, whose atomic masses add up approximately to that of uranium.

2. The supposed existence of the transuranium elements, those numbered 93, 94, 95, 96, heavier than uranium, is called into question. These superheavy elements may be merely forms of barium.

3. The radioactive "time clock" method of determining the age of the earth may be proved wrong if uranium can split up in the strange new manner.

4. Science has a new atomic mechanism that may account for the tremendous energy that keeps the stars shining through the ages.

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PSYCHOLOGY

Psychology of a Sissy Urged as Scientific Study

THE SISSY is nominated for psychological study by Dr. Joseph Chassell, psychiatrist at Sheppard and Enoch Pratt Hospital, Towson, Md.

No one really understands the sissy, Dr. Chassell points out in *Psychiatry*, although many an American boy is entirely preoccupied with the task of proving that he is not one.

Just what is a sissy? The term is well understood even in nursery school, and yet it would be hard to define it.

It does not mean "girlish," for girls can be sissies, too, or they can demonstrate that they are not. And a boy may even be effeminate without rating as a sissy.

Cries of "Sissy! Sissy!" accompanied by a gesture with the two forefingers familiar to all disdaining juveniles, is alternated with the chant, "Just a little baby!"

And yet mere youth does not make a sissy, either. It is a certain kind of immaturity. Boys may demonstrate while they are yet in rompers that sissihood is not for them. And the most unsophisticated, innocent, naive lad may be far removed from the sissy class.

Even the mother's darling with long curls and Lord Fauntleroy collar, Dr. Chassell said, may be recognized by the brotherhood as actually no sissy.

No, it seems to be not so much any of these things as an intangible feeling that they do not belong in the group of other boys. They are not in the gang.

The sissy seems to have a misapprehension of the world as a place where terrible things are always happening and where one must become some vague sort of superman in order to succeed.

Other humans are not seen as persons, he suggested, but as potentially friendly or hostile fairy-book creatures.

The sissy's idea of masculinity, he said, is a caricature built up with the aid of stories of the Wild West, Indian fighting, gangsters, and Buck Rogers. From this view of manhood is born a deep desire to turn away from it into mother's arms, which in its turn must be repressed.

When psychologists have made the study of the sissy, they should tackle next the sissifying mother, Dr. Chassell urged.

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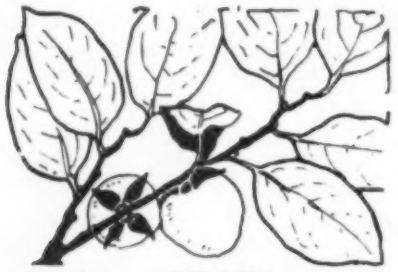
PLANT PATHOLOGY

NATURE RAMBLINGS
by Frank Thone



Persimmon Wilt Widespread

PERSIMMON wilt, a recently discovered fungus disease that kills persimmon trees in as little as two months, may wipe out this valuable and unique American species. Discovered only two summers ago in a limited area in Tennessee, it is now known to exist in practically all of the territory east and south of that state.

The present outlook is gloomy, admits R. Kent Beattie, plant pathologist of the U. S. Department of Agriculture. Unless resistant American strains can be found, it seems only a question of time until all the persimmon trees in the Southeast will be gone, just as the American chestnut went before the onset of the deadly fungus blight a generation or so ago. Then we shall have to comb the world for resistant species of persimmon, to replace the dead native trees.

Persimmon trees have several fields in which they are of major importance. Golf players, for example, will learn with a pang that the deadly fungus threatens the sole source of their drivers, brassies and other wooden clubs. No other wood has ever been found so satisfactory for this purpose.

Of even greater importance, however, is the persimmon's service as a soil-binding tree on eroding slopes. Soil conservation workers love the tree for the way it can drive a network of ropelike roots through slipping clay. The tree is also an important source of food for many wild animals and birds, as well as for domestic pigs and poultry in the South.

The big-fruited Japanese persimmon, which is coming increasingly into American markets, is immune to the fungus. But most of the trees in the Southeast have been grafted on American persimmon roots, so that these orchards are seriously endangered. Only in California, where Japanese persimmons are grown mainly on their own roots, or on the roots of another oriental persimmon species, does there appear to be less danger to this fruit crop.

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●RADIO

Lloyd Espenscheid of the Bell Telephone Laboratories will be guest scientist on "Adventures in Science" with Watson Davis, Director, Science Service. They will broadcast from a plane equipped with the new terrain clearance indicator, over the coast to coast network of the Columbia Broadcasting System, Thursday, Feb. 16, 7:15 p. m. EST, 6:15 p. m. CST, 5:15 p. m. MST, 4:15 p. m. PST. Listen in to your local station. Listen in each Thursday.

CHEMISTRY

How Science Discovered Saccharin's Sweetness

MANY of the older generation can remember the newspapers in 1884 and their stories of a new kind of "sugar" which was 500 times sweeter than the ordinary variety. And they may have read speculative tales, too, about the potency of the grain alcohol which could be made out of this new sugar. Actually what was reported was the discovery of the chemical saccharin, completely unrelated to sugar in a chemical sense, and without any fermentation properties.

Saccharin was discovered in the work of the graduate student C. Fahlberg in the laboratories of the then-famous Prof. Ira Remsen at the Johns Hopkins University.

Two stories exist about the discovery of saccharin's sweetness which bear retelling. One runs that Prof. Remsen was lecturing to his class one day with samples of many newly-prepared chemicals before him on the table. During class he unconsciously poked his pencil into several samples.

Later, in his office, he puzzled over a tough problem and touched the tip of the pencil point to his lips. Its amazing sweetness sent him scurrying back to the lecture hall where he systematically tasted all the chemicals until he found the one prepared by Fahlberg at his direction.

The other story, related by Fahlberg in Berlin in 1904 at a chemical congress, tells how he (Fahlberg) had been working all day in the laboratory. After washing his hands he went home to supper, but the bread and everything he handled tasted very sweet. He soon found that the sweetness came not from the food but from his hands and even his forearms.

The rest is quite similar, with Fahlberg tasting all the chemicals he had encountered that day. Remsen and Fahlberg's original paper on the discovery of saccharin was published in 1879. Their experiments were performed just 61 years ago, in 1878. The press of 1884 was only five years late with the news.

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VITAL STATISTICS

Aging Population Increases Death Rate From Falls

A NEW angle on the increasing age of our population appears in statistics on fatal accidents in the United States compiled by the Bureau of the Census. The figures, covering the year 1936, show that falls are pushing automobile accidents as cause of death.

During 1936, latest year on which figures are available, there were 110,052 deaths from accidents of all types. Nearly one-third of these fatal accidents, 32 per cent, were automobile accidents. Falls were second in importance, accounting for almost one-fourth, or 24 per cent, of the fatal accidents during the year.

"Deaths from falls have been increasing even more rapidly than those caused by automobiles," states the official report.

While automobile accident deaths increased 11 per cent. during the six-year period from 1930 to 1936, deaths from falls increased over 22 per cent.

The reason for this surprising state of affairs appears when the figures are broken down into age groups. Young persons are most liable to accidental deaths, nearly half the fatal accidents in 1936 occurring among persons under 45 years. More than half of all deaths from injury by fall, however, happen to persons over 65 years.

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ENGINEERING

Best Non-Skid Tires Give Constant Road Contact

AUTOMOBILE tires with treads so designed as to give continuous contact with the road and provide for side drainage of water give the best protection against skidding, Prof. John M. Lessells of the Massachusetts Institute of Technology reports. A tread with narrow zig-zag angular bars and with grooves for drainage "provides a greater co-efficient of friction on wet pavements," he asserts.

Such a tread if properly designed "acts as a windshield wiper to sweep the water from the road" in wet weather, Prof. Lessells finds. The provision of grooves for draining is necessary as a layer of water actually serves as a lubricant between tire and road.

A special two-wheeled trailer towed by a truck equipped with a sprinkler provided the wet roads for the test, rain or shine. Two years were spent in the study, carried out by K. D. Smith and W. F. Billingsley of the B. F. Goodrich Company.

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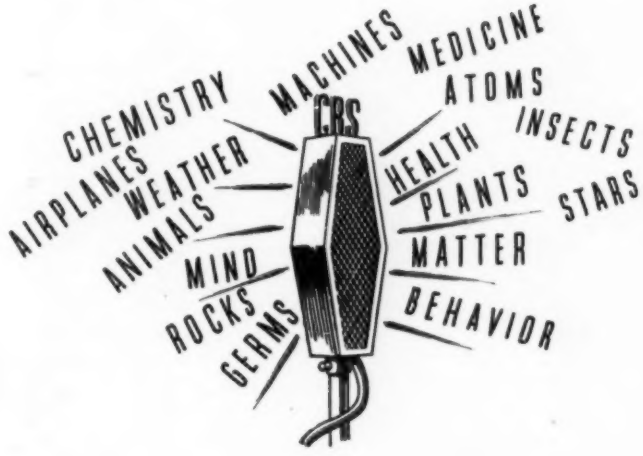
Adventures in Science!



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•First Glances at New Books

Archaeology

THE ROMANCE OF HUMAN PROGRESS—Arthur Stanley Riggs—*Bobbs-Merrill,* 405 p., $5. That Romans, Greeks, and other ancients were surprisingly like us is inevitably the most impressive thought carried away from a popular book on archaeology such as this. The author has chosen to tell facts learned as a result of archaeological investigation, rather than stress expeditions. Thus, the reader can learn what is old in chapters on housing, vanity, war, the healing arts, and many other human problems close to the hearts and minds of people in every age.

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Economics

CAUSE AND CONTROL OF THE BUSINESS CYCLE (2d. ed.)—E. C. Harwood—*Amer. Inst. for Econ. Res.,* 224 p., $2.

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General Science

REPORT OF THE UNITED STATES NATIONAL MUSEUM, 1938—*Govt. Print. Off.,* 121 p., 20 c.

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Physics

INTERPRETATIONS AND MISINTERPRETATIONS OF MODERN PHYSICS—Phillipp Frank—*Hermann & Cie, Paris,* 58 p., 18 fr. Ever since it became fashionable to interpret Einstein's relativity for the layman the amount of scanty misinformation which has been perpetuated about this and other aspects of modern physics has grown from year to year. To many of the wild statements which have been pushed on to the lay public Prof. Frank brings a much-needed spotlight of explanation. This little book has been needed for a long time by science.

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Physics

THE PRINCIPLES OF STATISTICAL MECHANICS—Richard C. Tolman—*Oxford Univ. Press,* 660 p., $9. The great number of pages in this splendid work are only a rough index of the importance of the subject matter and the comprehensiveness with which Prof. Tolman handles this complex work. Principles of ordinary mechanics allow scientists to make precise predictions as to the future state of a mechanical system from precise knowledge of its initial state. On the other hand, statistical mechanics fulfill the more difficult role of allowing reasonable predictions as to the future state of a system although the start is made from incomplete knowledge of the initial state. This forecasting of the future is preeminent in the newer physics with its treatment of the atom and its nucleus. Here is a book that will go into the reference library of the universities of the world and be used for years to come.

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Botany

INDEX TO NORTH AMERICAN FERNS—Maurice Broun, comp. and ed.—*Maurice Broun, Route 1, Orwigsburg, Pa.,* 217 p., $2.50. This book, though small in bulk, will figure very largely in making life easier for pteridologists and for botanists in general. It is a very carefully compiled checklist, going into subspecies and forms and giving full synonymy and habitat notes.

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Wildlife Management

WILDFOWL FOOD PLANTS: THEIR VALUE, PROPAGATION, AND MANAGEMENT—W. L. McAtee—*Collegiate Press,* 141 p., $1.50. Probably no one in this country (at least) knows more about what wildfowl like to eat than Mr. McAtee. In making his knowledge available in this convenient and practical form he has performed a real service to all workers in the fields of wildlife management, soil conservation, forestry, and applied biology generally.

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Horticulture

THE VEGETABLE GROWING BUSINESS—Ralph L. Watts and Gilbert Searle Watts—*Orange Judd,* 549 p., illus., $3.50. Good selection of subject matter and careful economy of words have enabled the authors to pack material that might have filled a cyclopedia between the covers of an average-sized book. It will serve equally well as a text for a thorough-going course in horticulture or as a one-volume reference library for the practical gardener.

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Geology

MIOCENE STRATIGRAPHY OF CALIFORNIA—Robert M. Kleinpell—*Amer. Assn. of Petroleum Geologists,* 450 p., 22 plates, $5. A thorough-going detailed study of one of the most important horizons of one of the most important geological areas in this country, whether regarded from the viewpoint of economic or "straight" geology. A book for professionals.

Science News Letter, February 11, 1939

Psychology

HOW TO ENJOY ILL HEALTH—Cecelia L. Schulz—*Whittlesey,* 194 p., $1.75. Humorous, entertaining and practical is this book by a registered nurse with many years of experience on which to draw for her advice. She tells patients and relatives many things to do and not to do which will make a siege of illness less of an ordeal, gives advice to the amateur home nurse, and provides a couple of hours of entertainment for dull days in bed.

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Safety

LET THEM LIVE—Stewart H. Holbrook—*Macmillan,* 178 p., $1.50. It is not often that a book with a moral is as exciting and absorbing as this one. The author paints a vivid picture of catastrophic industrial accidents, and describes the struggle of accident prevention and safety workers down to and including the fight to cut the automobile accident toll.

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Mathematics

AN INTRODUCTION TO THE THEORY OF NUMBERS—G. H. Hardy and E. M. Wright—*Oxford Univ.,* 403 p., $8. British text designed primarily for mathematicians and which, it is claimed, should be intelligible to a superior first-year student in mathematics. By American standards it is a book for graduate school use and for reference use in university libraries.

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Photography

PHOTOGRAPHIC CHEMICALS AND SOLUTIONS—J. I. Crabtree and G. E. Matthews—*Amer. Photo. Pub.,* 360 p., $4. Two Eastman Kodak experts discuss the chemistry of photographic solutions. Operation techniques, the method of manufacture and use are described in the book, which will be of interest to amateur photographers as well as the professionals.

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Home Economics—Chemistry

HANDBOOK OF FOOD MANUFACTURE—F. Fiene and Saul Blumenthal—*Chem. Pub. Co. of N. Y.,* 603 p., $6. Recipes and formulas for the professional food manufacturer, including all types of foods, syrups, flavors and other products of the food trade. Strictly a volume for the wholesale producer of prepared foodstuffs.

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